

What is claimed:

1. A method of predicting or determining immunoresistance to botulinum toxin therapy in an individual, comprising determining the presence or absence in said individual of antibodies immunoreactive with two or more amino acid sequences selected from the group: 785-803 of SEQ ID NO: 1 [N25]; 981-999 of SEQ ID NO: 1 [C10]; 1051-1069 of SEQ ID NO: 1 [C15]; 1121-1139 of SEQ ID NO: 1 [C20]; and 1275-1296 of SEQ ID NO: 1 [C31], or a conservative variant or immunoreactive fragment thereof,

wherein the presence of antibodies immunoreactive with said two or more amino acid sequences indicates immunoresistance to botulinum toxin therapy.

2. The method of claim 1, wherein each of said amino acid sequences are selected from the group: 785-803 of SEQ ID NO: 1 [N25]; 981-999 of SEQ ID NO: 1 [C10]; 1051-1069 of SEQ ID NO: 1 [C15]; 1121-1139 of SEQ ID NO: 1 [C20]; and 1275-1296 of SEQ ID NO: 1 [C31], or a conservative variant thereof.

3. The method of claim 1, wherein each of said amino acid sequences are selected from the group: 785-803 of SEQ ID NO: 1 [N25]; 981-999 of SEQ ID NO: 1 [C10]; 1051-1069 of SEQ ID NO: 1 [C15]; 1121-1139 of SEQ ID NO: 1 [C20]; and 1275-1296 of SEQ ID NO: 1 [C31], or an immunoreactive fragment variant thereof.

4. The method of claim 1, wherein each of said amino acid sequences are selected from the group: 785-803 of SEQ ID NO: 1 [N25]; 981-999 of SEQ ID NO: 1 [C10]; 1051-1069 of SEQ ID NO: 1 [C15]; 1121-1139 of SEQ ID NO: 1 [C20]; and 1275-1296 of SEQ ID NO: 1 [C31].

5. The method of claim 1, wherein one of said amino acid sequences comprises the amino acid sequence 785-803 of SEQ ID NO: 1 [N25] or a conservative variant or immunoreactive fragment thereof.

6. The method of claim 1, comprising determining the presence or absence in said individual of antibodies immunoreactive with the following two amino acid sequences: 785-803 of SEQ ID NO: 1 [N25]; and 981-999 of SEQ ID NO: 1 [C10], or a conservative variant or immunoreactive fragment thereof.

7. The method of claim 6, comprising determining the presence or absence in said individual of antibodies immunoreactive with the following two amino acid sequences: 785-803 of SEQ ID NO: 1 [N25]; and 981-999 of SEQ ID NO: 1 [C10], or a conservative variant thereof.
8. The method of claim 6, comprising determining the presence or absence in said individual of antibodies immunoreactive with the following two amino acid sequences: 785-803 of SEQ ID NO: 1 [N25]; and 981-999 of SEQ ID NO: 1 [C10], or an immunoreactive fragment thereof.
9. The method of claim 6, comprising determining the presence or absence in said individual of antibodies immunoreactive with the following two amino acid sequences: 785-803 of SEQ ID NO: 1 [N25]; and 981-999 of SEQ ID NO: 1 [C10].
10. The method of claim 1, comprising determining the presence or absence in said individual of antibodies immunoreactive with the following three amino acid sequences: 785-803 of SEQ ID NO: 1 [N25]; 981-999 of SEQ ID NO: 1 [C10]; and 1051-1069 of SEQ ID NO: 1 [C15], or a conservative variant or an immunoreactive fragment thereof.
11. The method of claim 10, comprising determining the presence or absence in said individual of antibodies immunoreactive with the following three amino acid sequences: 785-803 of SEQ ID NO: 1 [N25]; 981-999 of SEQ ID NO: 1 [C10]; and 1051-1069 of SEQ ID NO: 1 [C15], or a conservative variant thereof.
12. The method of claim 10, comprising determining the presence or absence in said individual of antibodies immunoreactive with the following three amino acid sequences: 785-803 of SEQ ID NO: 1 [N25]; 981-999 of SEQ ID NO: 1 [C10]; and 1051-1069 of SEQ ID NO: 1 [C15], or an immunoreactive fragment thereof.
13. The method of claim 10, comprising determining the presence or absence in said individual of antibodies immunoreactive with the following three amino acid sequences: 785-803 of SEQ ID NO: 1 [N25]; 981-999 of SEQ ID NO: 1 [C10]; and 1051-1069 of SEQ ID NO: 1 [C15].

14. The method of claim 1, 6 or 10, comprising selectively determining the presence or absence in said individual of IgG antibodies immunoreactive with each of said amino acid sequences.
15. The method of claim 1, 6 or 10, wherein the presence or absence of antibodies immunoreactive with each of said amino acid sequences is determined using an enzyme-linked immunosorbent assay.
16. The method of claim 1, 6 or 10, wherein the presence or absence of antibodies immunoreactive with each of said amino acid sequences is determined using a radioimmunoassay.
17. The method of claim 1, 6 or 10, wherein said botulinum toxin therapy is BoNT/A therapy.
18. A method of preventing or reducing immunoresistance to botulinum toxin therapy in an individual, comprising administering to said individual a tolerogizing agent and two or more amino acid sequences selected from the group: 785-803 of SEQ ID NO: 1 [N25]; 981-999 of SEQ ID NO: 1 [C10]; 1051-1069 of SEQ ID NO: 1 [C15]; 1121-1139 of SEQ ID NO: 1 [C20]; and 1275-1296 of SEQ ID NO: 1 [C31], or a conservative variant or an immunoreactive fragment thereof, thereby preventing or reducing immunoresistance to botulinum toxin therapy.
19. The method of claim 18, comprising administering to said individual a tolerogizing agent and two or more amino acid sequences selected from the group: 785-803 of SEQ ID NO: 1 [N25]; 981-999 of SEQ ID NO: 1 [C10]; 1051-1069 of SEQ ID NO: 1 [C15]; 1121-1139 of SEQ ID NO: 1 [C20]; and 1275-1296 of SEQ ID NO: 1 [C31] or a conservative variant thereof.
20. The method of claim 18, comprising administering to said individual a tolerogizing agent and two or more amino acid sequences selected from the group: 785-803 of SEQ ID NO: 1 [N25]; 981-999 of SEQ ID NO: 1 [C10]; 1051-1069 of SEQ ID NO: 1 [C15]; 1121-1139 of SEQ ID NO: 1 [C20]; and 1275-1296 of SEQ ID NO: 1 [C31] or an immunoreactive fragment thereof.

21. The method of claim 18, comprising administering to said individual a tolerogizing agent and two or more amino acid sequences selected from the group: 785-803 of SEQ ID NO: 1 [N25]; 981-999 of SEQ ID NO: 1 [C10]; 1051-1069 of SEQ ID NO: 1 [C15]; 1121-1139 of SEQ ID NO: 1 [C20]; and 1275-1296 of SEQ ID NO: 1 [C31].
22. The method of claim 18, comprising administering the following two amino acid sequences: 785-803 of SEQ ID NO: 1 [N25]; and 981-999 of SEQ ID NO: 1 [C10], or a conservative variant or an immunoreactive fragment thereof.
23. The method of claim 22, comprising administering the following two amino acid sequences: 785-803 of SEQ ID NO: 1 [N25]; and 981-999 of SEQ ID NO: 1 [C10], or a conservative variant thereof.
24. The method of claim 22, comprising administering the following two amino acid sequences: 785-803 of SEQ ID NO: 1 [N25]; and 981-999 of SEQ ID NO: 1 [C10], or an immunoreactive fragment thereof.
25. The method of claim 22, comprising administering the following two amino acid sequences: 785-803 of SEQ ID NO: 1 [N25]; and 981-999 of SEQ ID NO: 1 [C10].
26. The method of claim 18, comprising administering the following three amino acid sequences: 785-803 of SEQ ID NO: 1 [N25]; 981-999 of SEQ ID NO: 1 [C10]; and 1051-1069 of SEQ ID NO: 1 [C15], or a conservative variant or an immunoreactive fragment thereof.
27. The method of claim 26, comprising administering the following three amino acid sequences: 785-803 of SEQ ID NO: 1 [N25]; 981-999 of SEQ ID NO: 1 [C10]; and 1051-1069 of SEQ ID NO: 1 [C15], or a conservative variant thereof.
28. The method of claim 26, comprising administering the following three amino acid sequences: 785-803 of SEQ ID NO: 1 [N25]; 981-999 of SEQ ID NO: 1 [C10]; and 1051-1069 of SEQ ID NO: 1 [C15], or an immunoreactive fragment thereof.
29. The method of claim 26, comprising administering the following three amino acid sequences: 785-803 of SEQ ID NO: 1 [N25]; 981-999 of SEQ ID NO: 1 [C10]; and 1051-1069 of SEQ ID NO: 1 [C15].

30. The method of claim 18, 22 or 26, wherein said botulinum toxin therapy is BoNT/A therapy.
31. A method of vaccinating an individual against botulinum toxin, comprising administering to said individual a vaccine comprising an adjuvant and two or more amino acid sequences selected from the group 785-803 of SEQ ID NO: 1 [N25]; 981-999 of SEQ ID NO: 1 [C10]; 1051-1069 of SEQ ID NO: 1 [C15]; 1121-1139 of SEQ ID NO: 1 [C20]; and 1275-1296 of SEQ ID NO: 1 [C31], or a conservative variant or an immunoreactive fragment thereof, thereby producing an immune response to said botulinum toxin in said individual.
32. The method of claim 31, comprising administering to said individual a vaccine comprising an adjuvant and two or more amino acid sequences selected from the group: 785-803 of SEQ ID NO: 1 [N25]; 981-999 of SEQ ID NO: 1 [C10]; 1051-1069 of SEQ ID NO: 1 [C15]; 1121-1139 of SEQ ID NO: 1 [C20]; and 1275-1296 of SEQ ID NO: 1 [C31], or a conservative variant thereof.
33. The method of claim 31, comprising administering to said individual a vaccine comprising an adjuvant and two or more amino acid sequences selected from the group: 785-803 of SEQ ID NO: 1 [N25]; 981-999 of SEQ ID NO: 1 [C10]; 1051-1069 of SEQ ID NO: 1 [C15]; 1121-1139 of SEQ ID NO: 1 [C20]; and 1275-1296 of SEQ ID NO: 1 [C31], or an immunoreactive fragment thereof.
34. The method of claim 31, comprising administering to said individual a vaccine comprising an adjuvant and two or more amino acid sequences selected from the group: 785-803 of SEQ ID NO: 1 [N25]; 981-999 of SEQ ID NO: 1 [C10]; 1051-1069 of SEQ ID NO: 1 [C15]; 1121-1139 of SEQ ID NO: 1 [C20]; and 1275-1296 of SEQ ID NO: 1 [C31].
35. The method of claim 31, wherein one of said amino acid sequences comprises residues 785-803 of SEQ ID NO: 1 [N25] or a conservative variant or an immunoreactive fragment thereof.

36. The method of claim 31, comprising administering to said individual a vaccine comprising an adjuvant and the following two amino acid sequences: 785-803 of SEQ ID NO: 1 [N25]; and 981-999 of SEQ ID NO: 1 [C10], or a conservative variant or an immunoreactive fragment thereof.
37. The method of claim 31, comprising administering to said individual a vaccine comprising an adjuvant and the following two amino acid sequences: 785-803 of SEQ ID NO: 1 [N25]; and 981-999 of SEQ ID NO: 1 [C10], or a conservative variant thereof.
38. The method of claim 31, comprising administering to said individual a vaccine comprising an adjuvant and the following two amino acid sequences: 785-803 of SEQ ID NO: 1 [N25]; and 981-999 of SEQ ID NO: 1 [C10], or an immunoreactive fragment thereof.
39. The method of claim 31, comprising administering to said individual a vaccine comprising an adjuvant and the following two amino acid sequences: 785-803 of SEQ ID NO: 1 [N25]; and 981-999 of SEQ ID NO: 1 [C10].
40. The method of claim 31, comprising administering to said individual a vaccine comprising an adjuvant and the following three amino acid sequences: 785-803 of SEQ ID NO: 1 [N25]; 981-999 of SEQ ID NO: 1 [C10]; and 1051-1069 of SEQ ID NO: 1 [C15], or a conservative variant or an immunoreactive fragment thereof.
41. The method of claim 31, comprising administering to said individual a vaccine comprising an adjuvant and the following three amino acid sequences: 785-803 of SEQ ID NO: 1 [N25]; 981-999 of SEQ ID NO: 1 [C10]; and 1051-1069 of SEQ ID NO: 1 [C15], or conservative variant thereof.
42. The method of claim 31, comprising administering to said individual a vaccine comprising an adjuvant and the following three amino acid sequences: 785-803 of SEQ ID NO: 1 [N25]; 981-999 of SEQ ID NO: 1 [C10]; and 1051-1069 of SEQ ID NO: 1 [C15], or an immunoreactive fragment thereof.

43. The method of claim 31, comprising administering to said individual a vaccine comprising an adjuvant and the following three amino acid sequences: 785-803 of SEQ ID NO: 1 [N25]; 981-999 of SEQ ID NO: 1 [C10]; and 1051-1069 of SEQ ID NO: 1 [C15].

44. A method of removing botulinum toxin blocking antibodies from a patient, comprising the steps of

(a) removing blood from a patient;

(b) contacting said blood, or an antibody-containing component thereof with two or more amino acid sequences selected from the group 785-803 of SEQ ID NO: 1 [N25]; 981-999 of SEQ ID NO: 1 [C10]; 1051-1069 of SEQ ID NO: 1 [C15]; 1121-1139 of SEQ ID NO: 1 [C20]; and 1275-1296 of SEQ ID NO: 1 [C31], or a conservative variant or an immunoreactive fragment thereof, under conditions suitable for forming a complex of each of said amino acid sequences and anti-botulinum toxin antibody; and

(c) removing said complex from said blood or antibody-containing component thereof.

45. The method of claim 44, wherein step (b) comprises contacting said blood, or an antibody-containing component thereof, with the following two amino acid sequences: 785-803 of SEQ ID NO: 1 [N25]; and 981-999 of SEQ ID NO: 1 [C10], or a conservative variant or an immunoreactive fragment thereof.

46. The method of claim 44, wherein step (b) comprises contacting said blood, or an antibody-containing component thereof, with the following three amino acid sequences: 785-803 of SEQ ID NO: 1 [N25]; 981-999 of SEQ ID NO: 1 [C10]; and 1051-1069 of SEQ ID NO: 1 [C15], or a conservative variant or an immunoreactive fragment thereof.

47. The method of claim 44, 45 or 46, comprising selectively removing IgG botulinum toxin blocking antibodies from said patient.

48. A method of predicting or determining immunoresistance to botulinum toxin therapy in an individual, comprising the steps of :

(a) determining the level of IgG antibodies immunoreactive with said botulinum toxin in said individual; and

(b) comparing said level of IgG antibodies to a control level of IgG antibodies,

wherein an increase in said level of IgG antibodies in said individual as compared to said control level indicates immunoresistance to said botulinum toxin therapy.

49. The method of claim 48, wherein said increase is at least a 5-fold increase.

50. The method of claim 48, wherein said increase is at least a 10-fold increase.

51. The method of claim 48, wherein said control level of IgG antibodies is determined in an individual who has not been treated with botulinum toxin therapy.

52. The method of claim 48, wherein said control level of IgG antibodies is determined in an individual who is responsive to said botulinum toxin therapy.

53. The method of claim 48, wherein said botulinum toxin therapy is BoNT/A therapy.

54. A method of predicting or determining immunoresistance to botulinum toxin therapy in an individual, comprising determining the presence or absence in said individual of antibodies immunoreactive with a BoNT/A peptide having a length of at most 60 amino acids and comprising an amino acid sequence selected from the group:

445-471 of SEQ ID NO:1,

487-513 of SEQ ID NO:1,

515-541 of SEQ ID NO:1,

529-555 of SEQ ID NO:1,

543-569 of SEQ ID NO:1,

557-583 of SEQ ID NO:1,

585-611 of SEQ ID NO:1,



599-625 of SEQ ID NO:1,  
655-681 of SEQ ID NO:1,  
669-695 of SEQ ID NO:1,  
683-709 of SEQ ID NO:1,  
711-737 of SEQ ID NO:1,  
739-765 of SEQ ID NO:1,  
767-793 of SEQ ID NO:1,  
781-807 of SEQ ID NO:1,  
809-835 of SEQ ID NO:1,  
823-849 of SEQ ID NO:1, and  
837-863 of SEQ ID NO:1,

or a conservative variant or immunoreactive fragment thereof,

wherein the presence of antibodies immunoreactive with said peptide indicates immunoresistance to botulinum toxin therapy, and with the proviso that said BoNT/A peptide is not SEQ ID NO:2.

55. The method of claim 54, wherein said BoNT/A peptide comprises an amino acid sequence selected from the group:

515-541 of SEQ ID NO:1,  
529-555 of SEQ ID NO:1,  
543-569 of SEQ ID NO:1,  
585-611 of SEQ ID NO:1,  
655-681 of SEQ ID NO:1,  
739-765 of SEQ ID NO:1,  
781-807 of SEQ ID NO:1,  
809-835 of SEQ ID NO:1, and  
823-849 of SEQ ID NO:1,

or a conservative variant or immunoreactive fragment thereof, with the proviso that said BoNT/A peptide is not SEQ ID NO:2.

56. The method of claim 54, wherein said BoNT/A peptide has a length of at most 40 amino acids.
57. The method of claim 54, wherein said BoNT/A peptide has a length of at most 25 amino acids.
58. The method of claim 54, wherein said BoNT/A peptide comprises an amino acid sequence selected from the group: 445-471 of SEQ ID NO:1, 487-513 of SEQ ID NO:1, 515-541 of SEQ ID NO:1, 529-555 of SEQ ID NO:1, 543-569 of SEQ ID NO:1, 557-583 of SEQ ID NO:1, 585-611 of SEQ ID NO:1, 599-625 of SEQ ID NO:1, 655-681 of SEQ ID NO:1, 669-695 of SEQ ID NO:1, 683-709 of SEQ ID NO:1, 711-737 of SEQ ID NO:1, 739-765 of SEQ ID NO:1, 767-793 of SEQ ID NO:1, 781-807 of SEQ ID NO:1, 809-835 of SEQ ID NO:1, 823-849 of SEQ ID NO:1, and 837-863 of SEQ ID NO:1, or a conservative variant thereof.
59. The method of claim 54, wherein said BoNT/A peptide comprises an amino acid sequence selected from the group: 445-471 of SEQ ID NO:1, 487-513 of SEQ ID NO:1, 515-541 of SEQ ID NO:1, 529-555 of SEQ ID NO:1, 543-569 of SEQ ID NO:1, 557-583 of SEQ ID NO:1, 585-611 of SEQ ID NO:1, 599-625 of SEQ ID NO:1, 655-681 of SEQ ID NO:1, 669-695 of SEQ ID NO:1, 683-709 of SEQ ID NO:1, 711-737 of SEQ ID NO:1, 739-765 of SEQ ID NO:1, 767-793 of SEQ ID NO:1, 781-807 of SEQ ID NO:1, 809-835 of SEQ ID NO:1, 823-849 of SEQ ID NO:1, and 837-863 of SEQ ID NO:1, or an immunoreactive fragment thereof, with the proviso that said BoNT/A peptide is not SEQ ID NO:2
60. The method of claim 54, wherein said BoNT/A peptide comprises an amino acid sequence selected from the group: 445-471 of SEQ ID NO:1, 487-513 of SEQ ID NO:1, 515-541 of SEQ ID NO:1, 529-555 of SEQ ID NO:1, 543-569 of SEQ ID NO:1, 557-583 of SEQ ID NO:1, 585-611 of SEQ ID NO:1, 599-625 of SEQ ID NO:1, 655-681 of SEQ ID NO:1, 669-695 of SEQ ID NO:1, 683-709 of SEQ ID NO:1, 711-737 of SEQ ID NO:1, 739-765 of SEQ ID NO:1, 767-793 of SEQ ID NO:1, 781-807 of SEQ ID NO:1, 809-835 of SEQ ID NO:1, 823-849 of SEQ ID NO:1, and 837-863 of SEQ ID NO:1.

61. The method of claim 54, wherein said BoNT/A peptide consists of an amino acid sequence selected from the group: 445-471 of SEQ ID NO:1, 487-513 of SEQ ID NO:1, 515-541 of SEQ ID NO:1, 529-555 of SEQ ID NO:1, 543-569 of SEQ ID NO:1, 557-583 of SEQ ID NO:1, 585-611 of SEQ ID NO:1, 599-625 of SEQ ID NO:1, 655-681 of SEQ ID NO:1, 669-695 of SEQ ID NO:1, 683-709 of SEQ ID NO:1, 711-737 of SEQ ID NO:1, 739-765 of SEQ ID NO:1, 767-793 of SEQ ID NO:1, 781-807 of SEQ ID NO:1, 809-835 of SEQ ID NO:1, 823-849 of SEQ ID NO:1, and 837-863 of SEQ ID NO:1.

62. The method of claim 54, wherein said BoNT/A peptide comprises the amino acid sequence of residues 785-803 of SEQ ID NO: 1 or a conservative variant or immunoreactive fragment thereof.

63. The method of claim 54 or claim 62, comprising selectively determining the presence or absence in said individual of IgG antibodies immunoreactive with said BoNT/A peptide.

64. The method of claim 54, further comprising determining the presence or absence of antibodies immunoreactive with a H<sub>C</sub> peptide.

65. The method of claim 64, wherein said H<sub>C</sub> peptide comprises an amino acid sequence selected from the group:

amino acids 855-873 of SEQ ID NO:1

amino acids 869-887 of SEQ ID NO:1

amino acids 883-901 of SEQ ID NO:1

amino acids 897-915 of SEQ ID NO:1

amino acids 911-929 of SEQ ID NO:1

amino acids 925-943 of SEQ ID NO:1

amino acids 939-957 of SEQ ID NO:1

amino acids 953-971 of SEQ ID NO:1

amino acids 967-985 of SEQ ID NO:1

amino acids 981-999 of SEQ ID NO:1

amino acids 995-1013 of SEQ ID NO:1

amino acids 1009-1027 of SEQ ID NO:1

amino acids 1023-1041 of SEQ ID NO:1  
amino acids 1037-1055 of SEQ ID NO:1  
amino acids 1051-1069 of SEQ ID NO:1  
amino acids 1065-1083 of SEQ ID NO:1  
amino acids 1079-1097 of SEQ ID NO:1  
amino acids 1093-1111 of SEQ ID NO:1  
amino acids 1107-1125 of SEQ ID NO:1  
amino acids 1121-1139 of SEQ ID NO:1  
amino acids 1135-1153 of SEQ ID NO:1  
amino acids 1149-1167 of SEQ ID NO:1  
amino acids 1163-1181 of SEQ ID NO:1  
amino acids 1177-1195 of SEQ ID NO:1  
amino acids 1191-1209 of SEQ ID NO:1  
amino acids 1205-1223 of SEQ ID NO:1  
amino acids 1219-1237 of SEQ ID NO:1  
amino acids 1233-1251 of SEQ ID NO:1  
amino acids 1247-1265 of SEQ ID NO:1  
amino acids 1261-1279 of SEQ ID NO:1, and  
amino acids 1275-1296 of SEQ ID NO:1,

or a conservative variant or immunoreactive fragment thereof.

66. The method of claim 64, wherein said Hc peptide comprises an amino acid sequence selected from the group:

amino acids 939-957 of SEQ ID NO:1  
amino acids 953-971 of SEQ ID NO:1  
amino acids 967-985 of SEQ ID NO:1  
amino acids 981-999 of SEQ ID NO:1  
amino acids 995-1013 of SEQ ID NO:1  
amino acids 1009-1027 of SEQ ID NO:1  
amino acids 1023-1041 of SEQ ID NO:1

amino acids 1037-1055 of SEQ ID NO:1  
amino acids 1051-1069 of SEQ ID NO:1  
amino acids 1065-1083 of SEQ ID NO:1  
amino acids 1079-1097 of SEQ ID NO:1  
amino acids 1093-1111 of SEQ ID NO:1  
amino acids 1107-1125 of SEQ ID NO:1  
amino acids 1121-1139 of SEQ ID NO:1  
amino acids 1135-1153 of SEQ ID NO:1  
amino acids 1149-1167 of SEQ ID NO:1  
amino acids 1163-1181 of SEQ ID NO:1  
amino acids 1177-1195 of SEQ ID NO:1  
amino acids 1191-1209 of SEQ ID NO:1  
amino acids 1205-1223 of SEQ ID NO:1  
amino acids 1219-1237 of SEQ ID NO:1  
amino acids 1233-1251 of SEQ ID NO:1  
amino acids 1247-1265 of SEQ ID NO:1  
amino acids 1261-1279 of SEQ ID NO:1, and  
amino acids 1275-1296 of SEQ ID NO:1,

or an immunoreactive fragment thereof.

67. The method of claim 54, wherein the presence or absence of antibodies immunoreactive with two or more of said BoNT/A peptides is determined.

68. The method of claim 54, wherein the presence or absence of antibodies immunoreactive with five or more of said BoNT/A peptides is determined.

69. The method of claim 54, wherein the presence or absence of antibodies immunoreactive with ten or more of said BoNT/A peptides is determined.

70. The method of claim 67, 68 or 69, wherein each of said peptides is immobilized on a solid support.

71. The method of claim 54, wherein the presence or absence of antibodies immunoreactive with said BoNT/A peptide is determined using an enzyme-linked immunosorbent assay.
72. The method of claim 54, wherein the presence or absence of antibodies immunoreactive with said BoNT/A peptide is determined using a radioimmunoassay.
73. The method of claim 54, wherein said botulinum toxin therapy is BoNT/A therapy.
74. A method of preventing or reducing immunoresistance to botulinum toxin therapy in an individual, comprising administering to said individual a tolerogizing agent and a BoNT/A peptide, said peptide having a length of at most 60 amino acids and comprising an amino acid sequence selected from the group: 445-471 of SEQ ID NO:1, 487-513 of SEQ ID NO:1, 515-541 of SEQ ID NO:1, 529-555 of SEQ ID NO:1, 543-569 of SEQ ID NO:1, 557-583 of SEQ ID NO:1, 585-611 of SEQ ID NO:1, 599-625 of SEQ ID NO:1, 655-681 of SEQ ID NO:1, 669-695 of SEQ ID NO:1, 683-709 of SEQ ID NO:1, 711-737 of SEQ ID NO:1, 739-765 of SEQ ID NO:1, 767-793 of SEQ ID NO:1, 781-807 of SEQ ID NO:1, 809-835 of SEQ ID NO:1, 823-849 of SEQ ID NO:1, and 837-863 of SEQ ID NO:1,  
or a conservative variant or immunoreactive fragment thereof, thereby preventing or reducing immunoresistance to botulinum toxin therapy, with the proviso that said BoNT/A peptide is not SEQ ID NO:2.
75. The method of claim 74, wherein said BoNT/A peptide has a length of at most 40 amino acids.
76. The method of claim 74, wherein said BoNT/A peptide has a length of at most 25 amino acids.
77. The method of claim 74, wherein said BoNT/A peptide comprises an amino acid sequence selected from the group: 445-471 of SEQ ID NO:1, 487-513 of SEQ ID NO:1, 515-541 of SEQ ID NO:1, 529-555 of SEQ ID NO:1, 543-569 of SEQ ID NO:1, 557-583 of SEQ ID NO:1, 585-611 of SEQ ID NO:1, 599-625 of SEQ ID NO:1, 655-681 of SEQ ID NO:1, 669-695 of SEQ ID NO:1, 683-709 of SEQ ID NO:1, 711-737 of SEQ ID NO:1, 739-765 of SEQ ID NO:1, 767-793 of SEQ ID NO:1, 781-807 of SEQ ID NO:1, 809-835 of SEQ ID NO:1, 823-849 of SEQ ID NO:1, and 837-863 of SEQ ID NO:1, or a conservative variant thereof.

78. The method of claim 74, wherein said BoNT/A peptide comprises an amino acid sequence selected from the group: 445-471 of SEQ ID NO:1, 487-513 of SEQ ID NO:1, 515-541 of SEQ ID NO:1, 529-555 of SEQ ID NO:1, 543-569 of SEQ ID NO:1, 557-583 of SEQ ID NO:1, 585-611 of SEQ ID NO:1, 599-625 of SEQ ID NO:1, 655-681 of SEQ ID NO:1, 669-695 of SEQ ID NO:1, 683-709 of SEQ ID NO:1, 711-737 of SEQ ID NO:1, 739-765 of SEQ ID NO:1, 767-793 of SEQ ID NO:1, 781-807 of SEQ ID NO:1, 809-835 of SEQ ID NO:1, 823-849 of SEQ ID NO:1, and 837-863 of SEQ ID NO:1, or an immunoreactive fragment thereof, with the proviso that said BoNT/A peptide is not SEQ ID NO:2.

79. The method of claim 74, wherein said BoNT/A peptide comprises an amino acid sequence selected from the group: 445-471 of SEQ ID NO:1, 487-513 of SEQ ID NO:1, 515-541 of SEQ ID NO:1, 529-555 of SEQ ID NO:1, 543-569 of SEQ ID NO:1, 557-583 of SEQ ID NO:1, 585-611 of SEQ ID NO:1, 599-625 of SEQ ID NO:1, 655-681 of SEQ ID NO:1, 669-695 of SEQ ID NO:1, 683-709 of SEQ ID NO:1, 711-737 of SEQ ID NO:1, 739-765 of SEQ ID NO:1, 767-793 of SEQ ID NO:1, 781-807 of SEQ ID NO:1, 809-835 of SEQ ID NO:1, 823-849 of SEQ ID NO:1, and 837-863 of SEQ ID NO:1.

80. The method of claim 74, wherein said BoNT/A peptide consists of an amino acid sequence selected from the group: 445-471 of SEQ ID NO:1, 487-513 of SEQ ID NO:1, 515-541 of SEQ ID NO:1, 529-555 of SEQ ID NO:1, 543-569 of SEQ ID NO:1, 557-583 of SEQ ID NO:1, 585-611 of SEQ ID NO:1, 599-625 of SEQ ID NO:1, 655-681 of SEQ ID NO:1, 669-695 of SEQ ID NO:1, 683-709 of SEQ ID NO:1, 711-737 of SEQ ID NO:1, 739-765 of SEQ ID NO:1, 767-793 of SEQ ID NO:1, 781-807 of SEQ ID NO:1, 809-835 of SEQ ID NO:1, 823-849 of SEQ ID NO:1, and 837-863 of SEQ ID NO:1.

81. The method of claim 74, wherein said BoNT/A peptide comprises the amino acid sequence of residues 785-803 of SEQ ID NO: 1 or a conservative variant or immunoreactive fragment thereof.

82. The method of claim 74, wherein said tolerogizing agent and BoNT/A peptide are administered prior to said individual receiving botulinum toxin therapy.

83. The method of claim 82, wherein said individual is at increased risk for immunoresistance to botulinum toxin therapy.

84. A method of vaccinating an individual against botulinum toxin, comprising administering to said individual a vaccine comprising an adjuvant and a BoNT/A peptide, said peptide having a length of at most 60 amino acids and comprising an amino acid sequence selected from the group: 445-471 of SEQ ID NO:1, 487-513 of SEQ ID NO:1, 515-541 of SEQ ID NO:1, 529-555 of SEQ ID NO:1, 543-569 of SEQ ID NO:1, 557-583 of SEQ ID NO:1, 585-611 of SEQ ID NO:1, 599-625 of SEQ ID NO:1, 655-681 of SEQ ID NO:1, 669-695 of SEQ ID NO:1, 683-709 of SEQ ID NO:1, 711-737 of SEQ ID NO:1, 739-765 of SEQ ID NO:1, 767-793 of SEQ ID NO:1, 781-807 of SEQ ID NO:1, 809-835 of SEQ ID NO:1, 823-849 of SEQ ID NO:1, and 837-863 of SEQ ID NO:1,

or a conservative variant or immunoreactive fragment thereof, thereby producing an immune response to botulinum toxin in said individual, with the proviso that said BoNT/A peptide is not SEQ ID NO:2.

85. The method of claim 84, wherein said BoNT/A peptide comprises an amino acid sequence selected from the group: 515-541 of SEQ ID NO:1, 529-555 of SEQ ID NO:1, 543-569 of SEQ ID NO:1, 585-611 of SEQ ID NO:1, 655-681 of SEQ ID NO:1, 739-765 of SEQ ID NO:1, 781-807 of SEQ ID NO:1, 809-835 of SEQ ID NO:1, and 823-849 of SEQ ID NO:1,

or a conservative variant or immunoreactive fragment thereof, with the proviso that said BoNT/A peptide is not SEQ ID NO:2.

86. The method of claim 84, wherein said BoNT/A peptide has a length of at most 40 amino acids.

87. The method of claim 84, wherein said BoNT/A peptide has a length of at most 25 amino acids.



88. The method of claim 84, wherein said BoNT/A peptide comprises an amino acid sequence selected from the group: 445-471 of SEQ ID NO:1, 487-513 of SEQ ID NO:1, 515-541 of SEQ ID NO:1, 529-555 of SEQ ID NO:1, 543-569 of SEQ ID NO:1, 557-583 of SEQ ID NO:1, 585-611 of SEQ ID NO:1, 599-625 of SEQ ID NO:1, 655-681 of SEQ ID NO:1, 669-695 of SEQ ID NO:1, 683-709 of SEQ ID NO:1, 711-737 of SEQ ID NO:1, 739-765 of SEQ ID NO:1, 767-793 of SEQ ID NO:1, 781-807 of SEQ ID NO:1, 809-835 of SEQ ID NO:1, 823-849 of SEQ ID NO:1, and 837-863 of SEQ ID NO:1, or a conservative variant thereof.

89. The method of claim 84, wherein said BoNT/A peptide comprises an amino acid sequence selected from the group: 445-471 of SEQ ID NO:1, 487-513 of SEQ ID NO:1, 515-541 of SEQ ID NO:1, 529-555 of SEQ ID NO:1, 543-569 of SEQ ID NO:1, 557-583 of SEQ ID NO:1, 585-611 of SEQ ID NO:1, 599-625 of SEQ ID NO:1, 655-681 of SEQ ID NO:1, 669-695 of SEQ ID NO:1, 683-709 of SEQ ID NO:1, 711-737 of SEQ ID NO:1, 739-765 of SEQ ID NO:1, 767-793 of SEQ ID NO:1, 781-807 of SEQ ID NO:1, 809-835 of SEQ ID NO:1, 823-849 of SEQ ID NO:1, and 837-863 of SEQ ID NO:1, or an immunoreactive fragment thereof, with the proviso that said BoNT/A peptide is not SEQ ID NO:2.

90. The method of claim 84, wherein said BoNT/A peptide comprises an amino acid sequence selected from the group: 445-471 of SEQ ID NO:1, 487-513 of SEQ ID NO:1, 515-541 of SEQ ID NO:1, 529-555 of SEQ ID NO:1, 543-569 of SEQ ID NO:1, 557-583 of SEQ ID NO:1, 585-611 of SEQ ID NO:1, 599-625 of SEQ ID NO:1, 655-681 of SEQ ID NO:1, 669-695 of SEQ ID NO:1, 683-709 of SEQ ID NO:1, 711-737 of SEQ ID NO:1, 739-765 of SEQ ID NO:1, 767-793 of SEQ ID NO:1, 781-807 of SEQ ID NO:1, 809-835 of SEQ ID NO:1, 823-849 of SEQ ID NO:1, and 837-863 of SEQ ID NO:1.

91. The method of claim 84, wherein said BoNT/A peptide consists of an amino acid sequence selected from the group: 445-471 of SEQ ID NO:1, 487-513 of SEQ ID NO:1, 515-541 of SEQ ID NO:1, 529-555 of SEQ ID NO:1, 543-569 of SEQ ID NO:1, 557-583 of SEQ ID NO:1, 585-611 of SEQ ID NO:1, 599-625 of SEQ ID NO:1, 655-681 of SEQ ID NO:1, 669-695 of SEQ ID NO:1, 683-709 of SEQ ID NO:1, 711-737 of SEQ ID NO:1, 739-765 of SEQ ID NO:1, 767-793 of SEQ ID NO:1, 781-807 of SEQ ID NO:1, 809-835 of SEQ ID NO:1, 823-849 of SEQ ID NO:1, and 837-863 of SEQ ID NO:1.

92. The method of claim 84, wherein said BoNT/A peptide comprises the amino acid sequence of residues 785-803 of SEQ ID NO: 1 or a conservative variant or immunoreactive fragment thereof.

93. A BoNT/A peptide, comprising an amino acid sequence selected from the group: 445-471 of SEQ ID NO:1, 487-513 of SEQ ID NO:1, 515-541 of SEQ ID NO:1, 529-555 of SEQ ID NO:1, 543-569 of SEQ ID NO:1, 557-583 of SEQ ID NO:1, 585-611 of SEQ ID NO:1, 599-625 of SEQ ID NO:1, 655-681 of SEQ ID NO:1, 669-695 of SEQ ID NO:1, 683-709 of SEQ ID NO:1, 711-737 of SEQ ID NO:1, 739-765 of SEQ ID NO:1, 767-793 of SEQ ID NO:1, 781-807 of SEQ ID NO:1, 809-835 of SEQ ID NO:1, 823-849 of SEQ ID NO:1, and 837-863 of SEQ ID NO:1,

or a conservative variant or immunoreactive fragment thereof, said peptide having a length of at most 60 amino acids, with the proviso that said said BoNT/A peptide is not SEQ ID NO:2.

94. The peptide of claim 93, comprising an amino acid sequence selected from the group: 515-541 of SEQ ID NO:1, 529-555 of SEQ ID NO:1, 543-569 of SEQ ID NO:1, 585-611 of SEQ ID NO:1, 655-681 of SEQ ID NO:1, 739-765 of SEQ ID NO:1, 781-807 of SEQ ID NO:1, 809-835 of SEQ ID NO:1, and 823-849 of SEQ ID NO:1,

or a conservative variant or immunoreactive fragment thereof, with the proviso that said BoNT/A peptide is not SEQ ID NO:2.

95. The peptide of claim 93 or 94, having a length of at most 40 amino acids.

96. The peptide of claim 93 or 94, having a length of at most 25 amino acids.

97. The peptide of claim 93, which comprises an amino acid sequence selected from the group: 445-471 of SEQ ID NO:1, 487-513 of SEQ ID NO:1, 515-541 of SEQ ID NO:1, 529-555 of SEQ ID NO:1, 543-569 of SEQ ID NO:1, 557-583 of SEQ ID NO:1, 585-611 of SEQ ID NO:1, 599-625 of SEQ ID NO:1, 655-681 of SEQ ID NO:1, 669-695 of SEQ ID NO:1, 683-709 of SEQ ID NO:1, 711-737 of SEQ ID NO:1, 739-765 of SEQ ID NO:1, 767-793 of SEQ ID NO:1, 781-807 of SEQ ID NO:1, 809-835 of SEQ ID NO:1, 823-849 of SEQ ID NO:1, and 837-863 of SEQ ID NO:1, or a conservative variant thereof.

98. The peptide of claim 93, which comprises an amino acid sequence selected from the group: 445-471 of SEQ ID NO:1, 487-513 of SEQ ID NO:1, 515-541 of SEQ ID NO:1, 529-555 of SEQ ID NO:1, 543-569 of SEQ ID NO:1, 557-583 of SEQ ID NO:1, 585-611 of SEQ ID NO:1, 599-625 of SEQ ID NO:1, 655-681 of SEQ ID NO:1, 669-695 of SEQ ID NO:1, 683-709 of SEQ ID NO:1, 711-737 of SEQ ID NO:1, 739-765 of SEQ ID NO:1, 767-793 of SEQ ID NO:1, 781-807 of SEQ ID NO:1, 809-835 of SEQ ID NO:1, 823-849 of SEQ ID NO:1, and 837-863 of SEQ ID NO:1, or an immunoreactive fragment thereof, with the proviso that said BoNT/A peptide is not SEQ ID NO:2.

99. The peptide of claim 93, which comprises an amino acid sequence selected from the group: 445-471 of SEQ ID NO:1, 487-513 of SEQ ID NO:1, 515-541 of SEQ ID NO:1, 529-555 of SEQ ID NO:1, 543-569 of SEQ ID NO:1, 557-583 of SEQ ID NO:1, 585-611 of SEQ ID NO:1, 599-625 of SEQ ID NO:1, 655-681 of SEQ ID NO:1, 669-695 of SEQ ID NO:1, 683-709 of SEQ ID NO:1, 711-737 of SEQ ID NO:1, 739-765 of SEQ ID NO:1, 767-793 of SEQ ID NO:1, 781-807 of SEQ ID NO:1, 809-835 of SEQ ID NO:1, 823-849 of SEQ ID NO:1, and 837-863 of SEQ ID NO:1.

100. The peptide of claim 93, which consists of an amino acid sequence selected from the group: 445-471 of SEQ ID NO:1, 487-513 of SEQ ID NO:1, 515-541 of SEQ ID NO:1, 529-555 of SEQ ID NO:1, 543-569 of SEQ ID NO:1, 557-583 of SEQ ID NO:1, 585-611 of SEQ ID NO:1, 599-625 of SEQ ID NO:1, 655-681 of SEQ ID NO:1, 669-695 of SEQ ID NO:1, 683-709 of SEQ ID NO:1, 711-737 of SEQ ID NO:1, 739-765 of SEQ ID NO:1, 767-793 of SEQ ID NO:1, 781-807 of SEQ ID NO:1, 809-835 of SEQ ID NO:1, 823-849 of SEQ ID NO:1, and 837-863 of SEQ ID NO:1.

101. The peptide of claim 93, which comprises the amino acid sequence of residues 785-803 of SEQ ID NO: 1 or a conservative variant or immunoreactive fragment thereof.

102. A tolerogizing composition, comprising a tolerogizing agent and a BoNT/A peptide comprising an amino acid sequence selected from the group: 445-471 of SEQ ID NO:1, 487-513 of SEQ ID NO:1, 515-541 of SEQ ID NO:1, 529-555 of SEQ ID NO:1, 543-569 of SEQ ID NO:1, 557-583 of SEQ ID NO:1, 585-611 of SEQ ID NO:1, 599-625 of SEQ ID NO:1, 655-681 of SEQ ID NO:1, 669-695 of SEQ ID NO:1, 683-709 of SEQ ID NO:1, 711-737 of SEQ ID NO:1, 739-765 of SEQ ID NO:1, 767-793 of SEQ ID NO:1, 781-807 of SEQ ID NO:1, 809-835 of SEQ ID NO:1, 823-849 of SEQ ID NO:1, and 837-863 of SEQ ID NO:1,

or a conservative variant or tolerogenic fragment thereof, said peptide having a length of at most 60 amino acids, with the proviso that said BoNT/A peptide is not SEQ ID NO:2.

103. The composition of claim 102, wherein said BoNT/A peptide comprises an amino acid sequence selected from the group: 515-541 of SEQ ID NO:1, 529-555 of SEQ ID NO:1, 543-569 of SEQ ID NO:1, 585-611 of SEQ ID NO:1, 655-681 of SEQ ID NO:1, 739-765 of SEQ ID NO:1, 781-807 of SEQ ID NO:1, 809-835 of SEQ ID NO:1, and 823-849 of SEQ ID NO:1,

or a conservative variant or tolerogenic fragment thereof, with the proviso that said BoNT/A peptide is not SEQ ID NO:2.

104. The composition of claim 102, wherein said BoNT/A peptide has a length of at most 40 amino acids.

105. The composition of claim 102, wherein said BoNT/A peptide has a length of at most 25 amino acids.

106. The composition of claim 102, wherein said BoNT/A peptide comprises an amino acid sequence selected from the group: 445-471 of SEQ ID NO:1, 487-513 of SEQ ID NO:1, 515-541 of SEQ ID NO:1, 529-555 of SEQ ID NO:1, 543-569 of SEQ ID NO:1, 557-583 of SEQ ID NO:1, 585-611 of SEQ ID NO:1, 599-625 of SEQ ID NO:1, 655-681 of SEQ ID NO:1, 669-695 of SEQ ID NO:1, 683-709 of SEQ ID NO:1, 711-737 of SEQ ID NO:1, 739-765 of SEQ ID NO:1, 767-793 of SEQ ID NO:1, 781-807 of SEQ ID NO:1, 809-835 of SEQ ID NO:1, 823-849 of SEQ ID NO:1, and 837-863 of SEQ ID NO:1, or a conservative variant thereof.

107. The composition of claim 102, wherein said BoNT/A peptide comprises an amino acid sequence selected from the group: 445-471 of SEQ ID NO:1, 487-513 of SEQ ID NO:1, 515-541 of SEQ ID NO:1, 529-555 of SEQ ID NO:1, 543-569 of SEQ ID NO:1, 557-583 of SEQ ID NO:1, 585-611 of SEQ ID NO:1, 599-625 of SEQ ID NO:1, 655-681 of SEQ ID NO:1, 669-695 of SEQ ID NO:1, 683-709 of SEQ ID NO:1, 711-737 of SEQ ID NO:1, 739-765 of SEQ ID NO:1, 767-793 of SEQ ID NO:1, 781-807 of SEQ ID NO:1, 809-835 of SEQ ID NO:1, 823-849 of SEQ ID NO:1, and 837-863 of SEQ ID NO:1, or a tolerogenic fragment thereof, with the proviso that said BoNT/A peptide is not SEQ ID NO:2.

108. The composition of claim 102, wherein said BoNT/A peptide comprises an amino acid sequence selected from the group: 445-471 of SEQ ID NO:1, 487-513 of SEQ ID NO:1, 515-541 of SEQ ID NO:1, 529-555 of SEQ ID NO:1, 543-569 of SEQ ID NO:1, 557-583 of SEQ ID NO:1, 585-611 of SEQ ID NO:1, 599-625 of SEQ ID NO:1, 655-681 of SEQ ID NO:1, 669-695 of SEQ ID NO:1, 683-709 of SEQ ID NO:1, 711-737 of SEQ ID NO:1, 739-765 of SEQ ID NO:1, 767-793 of SEQ ID NO:1, 781-807 of SEQ ID NO:1, 809-835 of SEQ ID NO:1, 823-849 of SEQ ID NO:1, and 837-863 of SEQ ID NO:1.

109. The composition of claim 102, wherein said BoNT/A peptide consists of an amino acid sequence selected from the group: 445-471 of SEQ ID NO:1, 487-513 of SEQ ID NO:1, 515-541 of SEQ ID NO:1, 529-555 of SEQ ID NO:1, 543-569 of SEQ ID NO:1, 557-583 of SEQ ID NO:1, 585-611 of SEQ ID NO:1, 599-625 of SEQ ID NO:1, 655-681 of SEQ ID NO:1, 669-695 of SEQ ID NO:1, 683-709 of SEQ ID NO:1, 711-737 of SEQ ID NO:1, 739-765 of SEQ ID NO:1, 767-793 of SEQ ID NO:1, 781-807 of SEQ ID NO:1, 809-835 of SEQ ID NO:1, 823-849 of SEQ ID NO:1, and 837-863 of SEQ ID NO:1.

110. The composition of claim 102, wherein said BoNT/A peptide comprises the amino acid sequence of residues 785-803 of SEQ ID NO: 1 or a conservative variant or immunoreactive fragment thereof.

111. The composition of claim 102, wherein said tolerogizing agent is polyethylene glycol (PEG).

112. The composition of claim 102, wherein said tolerogizing agent is monomethoxypolyethylene glycol (mPEG).

113. The composition of claim 102, wherein said tolerogizing agent is polyvinyl alcohol (PVA).

114. A vaccine composition, comprising an adjuvant and a BoNT/A peptide comprising an amino acid sequence selected from the group: 445-471 of SEQ ID NO:1, 487-513 of SEQ ID NO:1, 515-541 of SEQ ID NO:1, 529-555 of SEQ ID NO:1, 543-569 of SEQ ID NO:1, 557-583 of SEQ ID NO:1, 585-611 of SEQ ID NO:1, 599-625 of SEQ ID NO:1, 655-681 of SEQ ID NO:1, 669-695 of SEQ ID NO:1, 683-709 of SEQ ID NO:1, 711-737 of SEQ ID NO:1, 739-765 of SEQ ID NO:1, 767-793 of SEQ ID NO:1, 781-807 of SEQ ID NO:1, 809-835 of SEQ ID NO:1, 823-849 of SEQ ID NO:1, and 837-863 of SEQ ID NO:1,

or a conservative variant or immunoreactive fragment thereof, said peptide having a length of at most 60 amino acids, with the proviso that said BoNT/A peptide is not SEQ ID NO:2.

115. The composition of claim 114, wherein said BoNT/A peptide comprises an amino acid sequence selected from the group: 515-541 of SEQ ID NO:1, 529-555 of SEQ ID NO:1, 543-569 of SEQ ID NO:1, 585-611 of SEQ ID NO:1, 655-681 of SEQ ID NO:1, 739-765 of SEQ ID NO:1, 781-807 of SEQ ID NO:1, 809-835 of SEQ ID NO:1, and 823-849 of SEQ ID NO:1,

or a conservative variant or immunoreactive fragment thereof, with the proviso that said BoNT/A peptide is not SEQ ID NO:2.

116. The composition of claim 114, wherein said BoNT/A peptide has a length of at most 40 amino acids.

117. The composition of claim 114, wherein said BoNT/A peptide has a length of at most 25 amino acids.

118. The composition of claim 114, wherein said BoNT/A peptide comprises an amino acid sequence selected from the group: 445-471 of SEQ ID NO:1, 487-513 of SEQ ID NO:1, 515-541 of SEQ ID NO:1, 529-555 of SEQ ID NO:1, 543-569 of SEQ ID NO:1, 557-583 of SEQ ID NO:1, 585-611 of SEQ ID NO:1, 599-625 of SEQ ID NO:1, 655-681 of SEQ ID NO:1, 669-695 of SEQ ID NO:1, 683-709 of SEQ ID NO:1, 711-737 of SEQ ID NO:1, 739-765 of SEQ ID NO:1, 767-793 of SEQ ID NO:1, 781-807 of SEQ ID NO:1, 809-835 of SEQ ID NO:1, 823-849 of SEQ ID NO:1, and 837-863 of SEQ ID NO:1, or a conservative variant thereof.

119. The composition of claim 114, wherein said BoNT/A peptide comprises an amino acid sequence selected from the group: 445-471 of SEQ ID NO:1, 487-513 of SEQ ID NO:1, 515-541 of SEQ ID NO:1, 529-555 of SEQ ID NO:1, 543-569 of SEQ ID NO:1, 557-583 of SEQ ID NO:1, 585-611 of SEQ ID NO:1, 599-625 of SEQ ID NO:1, 655-681 of SEQ ID NO:1, 669-695 of SEQ ID NO:1, 683-709 of SEQ ID NO:1, 711-737 of SEQ ID NO:1, 739-765 of SEQ ID NO:1, 767-793 of SEQ ID NO:1, 781-807 of SEQ ID NO:1, 809-835 of SEQ ID NO:1, 823-849 of SEQ ID NO:1, and 837-863 of SEQ ID NO:1, or an immunoreactive fragment thereof, with the proviso that said BoNT/A peptide is not SEQ ID NO:2.

120. The composition of claim 114, wherein said BoNT/A peptide comprises an amino acid sequence selected from the group: 445-471 of SEQ ID NO:1, 487-513 of SE ID NO:1, 515-541 of SEQ ID NO:1, 529-555 of SEQ ID NO:1, 543-569 of SEQ ID NO:1, 557-583 of SEQ ID NO:1, 585-611 of SEQ ID NO:1, 599-625 of SEQ ID NO:1, 655-681 of SEQ ID NO:1, 669-695 of SEQ ID NO:1, 683-709 of SEQ ID NO:1, 711-737 of SEQ ID NO:1, 739-765 of SEQ ID NO:1, 767-793 of SEQ ID NO:1, 781-807 of SEQ ID NO:1, 809-835 of SEQ ID NO:1, 823-849 of SEQ ID NO:1, and 837-863 of SEQ ID NO:1.

121. The composition of claim 114, wherein said BoNT/A peptide consists of an amino acid sequence selected from the group: 445-471 of SEQ ID NO:1, 487-513 of SEQ ID NO:1, 515-541 of SEQ ID NO:1, 529-555 of SEQ ID NO:1, 543-569 of SEQ ID NO:1, 557-583 of SEQ ID NO:1, 585-611 of SEQ ID NO:1, 599-625 of SEQ ID NO:1, 655-681 of SEQ ID NO:1, 669-695 of SEQ ID NO:1, 683-709 of SEQ ID NO:1, 711-737 of SEQ ID NO:1, 739-765 of SEQ ID NO:1, 767-793 of SEQ ID NO:1, 781-807 of SEQ ID NO:1, 809-835 of SEQ ID NO:1, 823-849 of SEQ ID NO:1, and 837-863 of SEQ ID NO:1.

122. The composition of claim 114, wherein said BoNT/A peptide comprises the amino acid sequence of residues 785-803 of SEQ ID NO: 1 or a conservative variant or immunoreactive fragment thereof.

123. A method of preparing an anti-BoNT/A antibody, comprising:

(a) administering to an animal a BoNT/A peptide having a length of at most 60 amino acids and comprising an amino acid sequence selected from the group: 445-471 of SEQ ID NO:1, 487-513 of SEQ ID NO:1, 515-541 of SEQ ID NO:1, 529-555 of SEQ ID NO:1, 543-569 of SEQ ID NO:1, 557-583 of SEQ ID NO:1, 585-611 of SEQ ID NO:1, 599-625 of SEQ ID NO:1, 655-681 of SEQ ID NO:1, 669-695 of SEQ ID NO:1, 683-709 of SEQ ID NO:1, 711-737 of SEQ ID NO:1, 739-765 of SEQ ID NO:1, 767-793 of SEQ ID NO:1, 781-807 of SEQ ID NO:1, 809-835 of SEQ ID NO:1, 823-849 of SEQ ID NO:1, and 837-863 of SEQ ID NO:1, or a conservative variant or immunoreactive fragment thereof;

(b) collecting from said animal a sample containing an antibody or antibody-producing cell; and

(c) processing said sample to isolate said anti-BoNT/A antibody, with the proviso that said BoNT/A peptide is not SEQ ID NO:2.

124. The method of claim 123, wherein said BoNT/A peptide comprises an amino acid sequence selected from the group: 515-541 of SEQ ID NO:1, 529-555 of SEQ ID NO:1, 543-569 of SEQ ID NO:1, 585-611 of SEQ ID NO:1, 655-681 of SEQ ID NO:1, 739-765 of SEQ ID NO:1, 781-807 of SEQ ID NO:1, 809-835 of SEQ ID NO:1, and 823-849 of SEQ ID NO:1, or a conservative variant or immunoreactive fragment thereof, with the proviso that said BoNT/A peptide is not SEQ ID NO:2.

125. The method of claim 123, wherein said BoNT/A peptide has a length of at most 40 amino acids.

126. The method of claim 123, wherein said BoNT/A peptide has a length of at most 25 amino acids.

127. The method of claim 123, wherein said BoNT/A peptide comprises an amino acid sequence selected from the group: 445-471 of SEQ ID NO:1, 487-513 of SEQ ID NO:1, 515-541



of SEQ ID NO:1, 529-555 of SEQ ID NO:1, 543-569 of SEQ ID NO:1, 557-583 of SEQ ID NO:1, 585-611 of SEQ ID NO:1, 599-625 of SEQ ID NO:1, 655-681 of SEQ ID NO:1, 669-695 of SEQ ID NO:1, 683-709 of SEQ ID NO:1, 711-737 of SEQ ID NO:1, 739-765 of SEQ ID NO:1, 767-793 of SEQ ID NO:1, 781-807 of SEQ ID NO:1, 809-835 of SEQ ID NO:1, 823-849 of SEQ ID NO:1, and 837-863 of SEQ ID NO:1, or a conservative variant thereof.

128. The method of claim 123, wherein said BoNT/A peptide comprises an amino acid sequence selected from the group: 445-471 of SEQ ID NO:1, 487-513 of SEQ ID NO:1, 515-541 of SEQ ID NO:1, 529-555 of SEQ ID NO:1, 543-569 of SEQ ID NO:1, 557-583 of SEQ ID NO:1, 585-611 of SEQ ID NO:1, 599-625 of SEQ ID NO:1, 655-681 of SEQ ID NO:1, 669-695 of SEQ ID NO:1, 683-709 of SEQ ID NO:1, 711-737 of SEQ ID NO:1, 739-765 of SEQ ID NO:1, 767-793 of SEQ ID NO:1, 781-807 of SEQ ID NO:1, 809-835 of SEQ ID NO:1, 823-849 of SEQ ID NO:1, and 837-863 of SEQ ID NO:1, or an immunoreactive fragment thereof, with the proviso that said BoNT/A peptide is not SEQ ID NO:2.

129. The method of claim 123, wherein said BoNT/A peptide comprises an amino acid sequence selected from the group: 445-471 of SEQ ID NO:1, 487-513 of SEQ ID NO:1, 515-541 of SEQ ID NO:1, 529-555 of SEQ ID NO:1, 543-569 of SEQ ID NO:1, 557-583 of SEQ ID NO:1, 585-611 of SEQ ID NO:1, 599-625 of SEQ ID NO:1, 655-681 of SEQ ID NO:1, 669-695 of SEQ ID NO:1, 683-709 of SEQ ID NO:1, 711-737 of SEQ ID NO:1, 739-765 of SEQ ID NO:1, 767-793 of SEQ ID NO:1, 781-807 of SEQ ID NO:1, 809-835 of SEQ ID NO:1, 823-849 of SEQ ID NO:1, and 837-863 of SEQ ID NO:1.

130. The method of claim 123, wherein said BoNT/A peptide consists of an amino acid sequence selected from the group: 445-471 of SEQ ID NO:1, 487-513 of SEQ ID NO:1, 515-541 of SEQ ID NO:1, 529-555 of SEQ ID NO:1, 543-569 of SEQ ID NO:1, 557-583 of SEQ ID NO:1, 585-611 of SEQ ID NO:1, 599-625 of SEQ ID NO:1, 655-681 of SEQ ID NO:1, 669-695 of SEQ ID NO:1, 683-709 of SEQ ID NO:1, 711-737 of SEQ ID NO:1, 739-765 of SEQ ID NO:1, 767-793 of SEQ ID NO:1, 781-807 of SEQ ID NO:1, 809-835 of SEQ ID NO:1, 823-849 of SEQ ID NO:1, and 837-863 of SEQ ID NO:1.

131. The method of claim 123, wherein said BoNT/A peptide comprises the amino acid sequence of residues 785-803 of SEQ ID NO: 1 or a conservative variant or immunoreactive fragment thereof.

132. The method of claim 123, wherein said antibody is polyclonal.

133. The method of claim 123, wherein said antibody is monoclonal.